Seventh Annual
Science Undergraduate Research Symposium

Thursday, December 2, 2010

KEYNOTE ADDRESS
Beaman Student Life Center Meeting Room A/B
4:00 PM

"Insights into the Workings of the Human Brain Using Functional Magnetic Resonance Imaging"

Dr. Victoria Morgan
Assistant Professor of Radiology & Radiological Sciences
and
Assistant Professor of Biomedical Engineering
Vanderbilt University

STUDENT POSTER SESSION
McWhorter Lobby
5:15 – 6:00 PM

STUDENT ORAL PRESENTATIONS
McWhorter rooms 110 & 114
(Simultaneous sessions)
6:15 – 9:00 PM
**POSTER SESSION**

McWhorter Lobby

5:15-6:00 PM

**Biology**

“Can Zebrafish Be Trained To Cue To A Specific Wavelength Of UV Light?”

Taylor Andrew

Faculty Advisor: Lori McGrew, Ph.D.

Major: Biology

The zebrafish (*Danio rerio*) has become a popular model for several different fields in the biological sciences, especially within the division of neuroscience. Among the many areas in which zebrafish have been researched neurologically, the investigation of the visual processing system including genetic, anatomical, and physiological studies have led to insightful discoveries about the behavior of this species. Previous research suggests that zebrafish are able to discriminate between discrete wavelengths of color through training. In recent studies, it has been found that zebrafish not only have the ocular faculties necessary for the perception of color, but also for the perception of ultraviolet light. This research explores the zebrafish’s ability to perceive UV light in a UV-cue based learning procedure. Using a multi-chambered tank with removable gates, the zebrafish were trained to enter chambers based on a UV light cue that was presented with a brine shrimp food reward. The zebrafish’s ability to learn to cue on the UV-brine shrimp reward combination was based on the number of times the zebrafish entered the correct chamber. This research was designed to specifically test whether zebrafish can learn to cue on a UV light stimulus despite the fact that they may have an inherent instinct to avoid it.

“The Effect of Elevated Testosterone Levels on the Working Memory of the Species, *Danio rerio*”

Steven J. Avers

Faculty Advisor: Lori McGrew Ph.D.

Major: Biology

Testosterone, the male sex steroid hormone, is intimately involved in the development of reproductive organs, as well as neurological development and behaviors. There have been recent studies that have shown that there could be a correlation between low testosterone levels, and the inability to recall memories and learn new things, as evident in dementia of the Alzheimer’s type (Hogervorst, 2001). It was hypothesized that elevated levels of testosterone in zebrafish may lead to an increase in working memory. 11-ketotestosterone, the active form of testosterone in zebrafish, was used at four concentrations, a control, 0.1 µM, 1.0 µM, or 10 µM, in separate tanks with 30 fish per concentration that were submerged in the solution for 1 hour. The fish were then each individually placed into a t-maze tank and were rewarded or punished depending on the side they chose to swim to. The 10 trials for testing working memory were conducted for each fish, and the time it took to chose a side and which side they chose were recorded. From the data, it was shown that the fish that had elevated testosterone levels did in fact chose the correct side more often and quicker than the control groups.

“Repellent Properties of Common Herbs of the Family *Labiatae* Against the American Dog Tick, *Dermacentor variabilis*”

Sarah E. Ayers

Faculty Advisor: C. Steven Murphree, Ph.D.

Major: Biology

The threat of contracting diseases vectored by ticks has been a consistent catalyst for the production of effective tick repellents. In recent years, public demand has shifted towards natural repellents and has subsequently directed researchers towards the production of plant-based products that are as effective as their synthetic counterparts (e.g., DEET). The repellency of three common herbs of the *Labiatae*: *Salvia officinalis* (sage), *Ocimum basilicum* (basil), and *Lavandula angustifolia* (lavender) against *Dermacentor variabilis* was observed using an in vitro assay. Each herb essential oil extract was tested at 10%, 25%, and 50% concentrations in acetone. Significant repellency was detected for both lavender and basil extracts at concentrations of 25% and 50%. No significant repellency was observed for sage extract or for any essential oil at the 10% concentration level.
"Creating A Zebrafish Model of Parkinson's Disease."
Taylor Beazley
Faculty Advisor: Lori L. McGrew, Ph.D.
Major: Biology

Parkinson’s Disease is a neurodegenerative disease that develops gradually in humans. It is treated case-by-case because there is no definite cure. Therefore, patients are treated depending on their particular symptoms. To further investigate treatment, zebrafish, a relatively unexplored and enlightening model organism for research on Parkinson’s Disease, was studied. The focus of the research was devoted to creating zebrafish that exhibit damaged primary and secondary motor skills, which are hallmark symptoms of Parkinson’s Disease in humans. Poor motor skills indicate that the cells producing dopamine in the substantia nigra are degenerating, halting the ability of the body to coordinate proper movements. Zebrafish were treated with a neurotoxin, 6-hydroxydopamine (6-OHDA), to induce Parkinson’s Disease symptoms present in humans with the intent to better understand zebrafish as a model organism. Motor coordination was then evaluated using a grid system to estimate speed as well as qualitative scoring of dorsal-lateral locomotion.

“The Effects of *Lonicera maackii* on the Diversity of Small Woody Plants at Warner Parks in Nashville, TN”
Julianna Bejma
Faculty Advisor: A. Darlene Panvini, Ph.D.
Major: Biology

The prevalence of exotic plants can lead to a decrease in biodiversity in surrounding areas. *Lonicera maackii*, bush honeysuckle, is an exotic shrub commonly found in Tennessee. This project examines the impact of *L. maackii* on the diversity of small woody plants in three plot types: honeysuckle removed six months prior to data collection, honeysuckle present, and honeysuckle historically absent. Woody plants less than 1 m tall were counted and identified in five 10 m² plots. Height of small shrubs in five 1 m² subplots was measured and assigned to height classes. No significant difference in presence of honeysuckle and native species was found between plot types; however, a general trend suggests that with more data, a significant difference would be found between plots with and without honeysuckle. This project is in the early phase of a long-term study of the impact of *L. maackii* on small woody species.

“The Persistence of Chemical Cues in an Aquatic Predator/Prey System”
Caleb Binkley
Faculty Advisor: John Niedzwiecki, Ph.D.
Major: Biology

In this research, the goal was to measure persistence of chemical cues in an aquatic predator/prey system. A Physid snail and *Orconectes juvenilis* (freshwater crayfish) were the prey and predator. Since all potential prey must “trade off” risk of predation and time spent foraging, the animal must decide to forage for resources to grow and reproduce, or stay immobile, avoid predators, but not gain resources produce offspring. Being able to detect the presence of a predator is therefore important. Chemical cues can potentially exist for a long time, it would be helpful if a snail could gauge the age of the chemical cue. Both snails and crayfish were collected in the same freshwater streams. Snails were divided into five treatment groups and were allowed to forage in the water. Snails were exposed to a fresh cue, an hour old cue, two hour old cue, and three hour old cue. Results showed that snails showed the greatest anti-predator response most to the fresh cue – for the majority of the time, the snail did not move around in the water. Snails were most active in water with the 3 hour old cue. These results support the ideas that snails were assessing risk based on the age of the crayfish cue, and finding a potentially optimal trade-off of risk and reward.

“The Effects of 6-hydroxydopamine on Chemotaxis in *Caenorhabditis elegans*”
Lindsey Dalton
Faculty Advisor: Nick Ragsdale
Major: Biology

Recent investigations have looked at the effect of 6-hydroxydopamine (a known neurotoxin to the dopaminergic neurons) on the locomotion of *Caenorhabditis elegans* (*C. elegans*) in response to a physical stimulus. An unexpected result was an increase in velocity that occurred within the first 5-10 seconds following the physical stimulus. While *C. elegans* undoubtedly responds to physical stimuli in the wild, a more natural stimulus is the chemotaxis to a food source. The current study investigates the intentional chemotaxis of *C. elegans* toward known attractants following 6-hydroxydopamine treatment.
“Analysis of Interferon Regulatory Factor-3 Levels in Cell Lines Expressing Human Papillomavirus”
Brittney D. Everhart
Faculty Advisor: Jennifer T. Thomas, Ph.D.
Major: Biology

Cancer is a disease caused by excessive abnormal cell growth that affects close to 12 million people a year. Cervical cancer, found only in women, has recently gained attention from the development of the vaccine, Gardasil. The most prevalent cause of cervical cancer is infection with the human papillomavirus (HPV). HPV promotes cervical cancer primarily by attacking the tumor suppressor proteins, p53 and pRb. In addition, HPV is allowed to thrive in the body by inhibiting the immune responses that normally occur. One mechanism is preventing interferon regulatory factor 3’s (IRF-3) ability to activate antiviral genes. This research is designed to study the difference in levels of IRF-3 between cell lines expressing high-risk HPV and cell lines that do not express HPV. We are currently using western blot technique to determine IRF-3 protein levels in our cell lines and the possible impact of HPV on IRF-3 expression.

“Effects of Multiple Predation Cues on Physid Snail Behavior”
Amy Fehrmann
Faculty Advisor: John Niedzwiecki, Ph.D.
Major: Biology

Physa sp. snails dwelling in the streams around Nashville face a variety of predator threats. Chemical cues can stimulate anti-predatory behavior in a variety of aquatic systems. We tested behavioral changes to predator (crayfish) and alarm (crushed snail) cues, as well as the combination of these cues. We found that snails react quickest and crawl out of the water in response to a cue containing only crayfish odor, but the reaction with a combination cue is more complex. The snails remain stationary for approximately an hour before crawling out of the water and remaining there. The threat of the combination cue, indicating an actual predator event has occurred, may compel the snails to stay still to have a better chance of survival in the face of the predatory threat.

“The Effects of Rotenone on Chemotaxis in Caenorhabditis elegans”
Julie Malkowski
Faculty Advisor: Nick Ragsdale
Major: Biology

Caenorhabditis elegans (C. elegans) has been utilized as a model for Parkinson’s disease. Common practice is to induce the loss of dopaminergic neuronal death utilizing various neurotoxins. One such neurotoxin is 6-hydroxydopamine (6-OHDA). 6-OHDA supposedly works by inhibiting some of the enzymes utilized to make catecholamines. It is hypothesized that this enzymatic inhibition results in the production of oxygen radicals that eventually kill the dopaminergic neuron. To investigate this hypothesis, the current research utilized rotenone as a comparison dopaminergic neuronal neurotoxin. Rotenone has been investigated thoroughly and has been shown to kill neuronal cells via oxidative damage after the inhibition of electron transfer in the mitochondrial electron transport chain. A comparison between the effects of rotenone versus 6-OHDA was made to determine if C. elegans chemotaxed in a similar fashion following treatment with either neurotoxin.

“Sublethal Effects of pH on the Activity of Physid Snails”
Mark McFarland
Faculty Advisor: John Niedzwiecki, Ph.D.
Major: Biology

Abiotic factors have been known to have a negative effect on biodiversity. Abiotic factors that alter behavior can have negative effects on fitness without causing mortality. For example, a change in a factor that causes organisms to stay in shelter and not forage, would limit energy available for growth and reproduction. Aquatic Snails, in the genus Physa, are potentially vulnerable to changes in water conditions and could change snail behavior. The effects of acidic water were measured by proportion of time spent active and proportion of time spent on the wall or the bottom of a cup. A Two-Sample T-Test was used to compare the means of two groups (Experimental, pH=5 ; Control pH=7) and showed no difference in movement. However, the experimental group spent a significantly more amount of time on the wall of the cup, including outside the water column. This shows that the change in water conditions could be affecting the behavior of aquatic snails, and it could be a negative impact if food is less available on the sides of the cup. Future research may yield why and what the costs in the foraging change might be.
“The Antimicrobial Effects of Herbs and Spices on Gram-Positive and Gram-Negative Bacteria”
Ariel Ouellette
Faculty Advisor: A. Darlene Panvini, Ph.D. and Jennifer Thomas, Ph.D.
Major: Biology

Herbs and spices have been used for thousands of years all over the world due to their significant properties. They not only add color and flavor to food, but they often exhibit healing properties and antimicrobial properties. Many factors play a role in the antimicrobial activity of herbs and spices, but the three factors that were observed in this experiment are the Gram-stain of the microorganisms, whether the microorganisms are found in the body or the soil, and the part of the plant that is being derived as an herb or a spice. The type of herb and type of bacteria both show significance in determining antimicrobial activity of herbs/spices, and Gram-negative bacteria shows more resistance to antimicrobial activity than Gram-positive bacteria. There is no significant correlation between the origin of the bacteria and antimicrobial activity or between the structure of the plant and antimicrobial activity.

“Indirect Effects of Predation Risk on Dragonfly Nymph Foraging”
Atinuke Osinusi
Faculty Advisor: John Niedzwiecki
Major: Biology

Trade-off situations are something most organisms have to experience. They have to consider whether they want to forage for food at the expense of potentially being eaten by a predator, or whether to hide from the predator and risk starving or not obtaining enough food to grow and develop. In this situation, some dragonfly nymphs (Sympetrum) were exposed to predatory cues from green sunfish (Lepomis cyanellus) and my aim was to provide evidence of trade-offs between the dragonfly choosing to be a more active predator or decrease their activity when the sunfish cue is present at the risk of being eaten. Activity was measured by direct observation of movements over the first twenty minutes of forging. Effective foraging was directly measured by the number of brine shrimp eaten over two hours. It was interesting to see if the dragonfly nymphs even had the ability to respond to cues from the green sunfish as the predatory cues has been shown to affect the behavior of many intermediate predators. The results showed no change in activity or foraging success with or without sunfish cues. Either dragonflies cannot detect the predators at all or use something other than chemical cues. Some dragonflies are restricted to fish free waters by the lack of anti-predator behavior.

“The Role of Dopamine in Learning and Aggression in Danio rerio”
Katy Parsley
Faculty Advisor: Lori L.McGrew, Ph.D.
Major: Biology

Danio rerio, a vertebrate with known complex behaviors, is quickly becoming a popular model organism in the behavioral research community. Recent studies on the dopaminergic system of zebrafish have revealed similarities between zebrafish and that of mammals. Specific dopaminergic neurons have even been differentiated. This research explores how the following changes in the dopaminergic system alter learning ability and aggressive behavior. This was accomplished by administering drugs dissolved in tank water that blocked DA receptors for one test group and inhibited DA transporters for another test group and comparing each to a control group. Learning was assessed using a t-maze utilizing a reward system and color cues. And aggression was assessed using a simple three part tank and a video scoring system. Studies such as this are important to validate zebrafish as a model organism and allow for more specific studies on the path to determine long term drug effects.

“A Comparison of Insect Collections Using CDC Light Traps Equipped with Incandescent and Green Light-Emitting Diode Light Sources”
Katie L. Rice
Faculty Advisor: C. Steven Murphree, Ph.D.
Major: Biology

Centers for Disease Control (CDC) light traps equipped with an incandescent bulb are the standard for collecting night-flying insects. Recent research has demonstrated that CDC light traps equipped with green LED bulbs attract greater numbers of some insects (e.g., biting midges). This study compared collections from a standard CDC incandescent light trap with those of a trap equipped with three green LED bulbs in a wooded area in Davidson County, Tennessee. Collections in ethanol were removed twice weekly between late September and late October. A preliminary analysis of the collections has shown that the trap equipped with the incandescent bulb attracted a greater diversity of species and number of individuals than the trap equipped with green LED bulbs.
“Effect of Human Papillomavirus on Levels of TLR-9 in Cervical Carcinoma Cell Lines”
Jessica E. Rix
Faculty Advisor: Jennifer T. Thomas, Ph.D.
Major: Biology

Cervical cancer affects over half of a million women worldwide. Human Papillomaviruses (HPVs) are the cause of over 90% of cervical cancer cases. HPV is separated into high risk and low risk types depending on their ability to cause cancer. In high risk types, the E6 and E7 proteins inactivates the tumor suppressor proteins, p53 and pRb. High risk HPV is also shown to reduce the body’s immune response. One of the ways it does this is by inhibiting the inflammatory response of Toll-like Receptor 9 (TLR-9) in cells that express E6 and E7 from HPV 16 and HPV 18, both high risk types. This current project will test the effects of HPV 31, another high risk type on levels of TLR-9, as well as the levels of TLR9 in HPV negative cervical cell lines.

“The Effects of Aging on Chemotaxis in Caenorhabditis elegans”
Kathryn Roach
Faculty Advisor: Nick Ragsdale
Major: Biology

As the body ages, it accumulates damage from oxygen radicals. Additionally, the body’s ability to prevent additional oxidative damage diminishes. The current study investigates the affect of aging on the ability of Caenorhabditis elegans to chemotax to a known attractant.

“Analysis of Integrin Protein Levels in Cervical Cell Lines Expressing Human Papillomavirus”
Emily L. Smothers
Faculty Advisor: Jennifer T. Thomas, Ph.D.
Major: Biology

Human papillomaviruses (HPVs) are the leading cause of sexually transmitted diseases of viral origin. The two categories of HPV are high and low risk; high risk infections are associated with anogenital cancers, whereas low risk infections are associated with genital warts. It is estimated that 11,000 women in the United States are diagnosed with cervical cancer each year. Viral proteins E6 and E7 are of interest, as they have been shown to facilitate rapid cellular and, therefore, viral proliferation and impede apoptosis. Other proteins are involved in the infectious cycle of viruses, especially those that function in cell to cell adhesion; integrin is one such protein. Seven cell lines and the techniques gel electrophoresis and Western blotting are currently being used to determine if there is a relationship between HPV and integrin protein expression. Determination of such a relationship may impact the future of both cervical cancer and HPV research.

“Expression Levels of Selectin in Human Papillomavirus Positive and Negative Cell Lines”
Matthew C. Turner
Faculty Advisor: Jennifer T. Thomas, Ph.D.
Major: Biology

It is estimated that 1 out of 147 women worldwide will be diagnosed with cervical cancer in her life. Furthermore, more than 90% of all cervical cancer cases are associated with infection by the Human Papillomavirus (HPV), which uses its own proteins to alter the proteins of the host. These host proteins play important roles in cell-cell adhesion, immune response, and cell cycle regulation, to name a few. Selectin is a cell adhesion molecule that is usually observed in endothelial cells that line blood vessels. However, some studies suggest that selectins are expressed in diseases of the gingival epithelia. This raises the question of whether selectin is expressed in other epithelial cells such as those of the genital tract and if expression of HPV might affect the levels of selectin in these cells. We are currently examining selectin levels through Western Blot analysis in HPV positive and HPV negative cell lines.
Biochemistry and Molecular Biology

“Olfactory Responses of C. elegans to Selected Bacterial Species”
Gabrielle S. Facey
Faculty Advisor: Robert T. Grammer
Major: Biochemistry and Molecular Biology

The study of olfaction and chemotaxis in the nematode Caenorhabditis elegans gives insight into human olfaction and the integration of sensory and motor functions. Chemotactic studies have been previously reported using various chemicals and different species of bacteria. Previous work done in this lab examined the chemotactic behavior of C. elegans to benzaldehyde as a function of prior exposure. Now, in current work, that technique is being attempted with various bacteria. The chemical isoamyl alcohol—a known attractant to C. elegans—was tested using this behavioral assay, and the results resembled literature values. With the results found with isoamyl alcohol serving as a positive control, we are now seeking to examine the behavior of C. elegans toward E. coli OP50, Serratia marcescens, and Pseudomonas aeruginosa in the migration assay.

“Design of a Four-Fold Sequence and Structure Symmetric TIM-Barrier”
William Proffitt
Faculty Advisor: Rachel E. Rigsby, Ph. D.
Major: Biochemistry and Molecular Biology

In 2010, the Meiler Lab at Vanderbilt University showed it was possible to rationally create a sequence and fold symmetric (βα)₈-barrel based on a protein from the histidine biosynthesis pathway (HisF). Using Rosetta, various decoys, created by the duplication and concatenation of permutations of the backbone of HisF (pdb code 1THF), were evaluated and it was discovered that the lowest energy structure resulted from the duplication and concatenation of residues 94 to 215 of HisF. While this research shows that it is possible to use computational techniques to rationally find sequences to design a 2-fold symmetric TIM-barrel protein, little research has been done on generating rationally designed TIM-barrels that exhibit 4-fold symmetry, which is the highest amount of symmetry possible in this protein. This project seeks to computationally design a TIM-barrel that has perfect four-fold symmetry in sequence and structure by minimal re-design of an existing TIM-barrel protein.

“The Effects of Dopamine on Chemotaxis in Caenorhabditis elegans”
Luke Starner
Faculty Advisor: Nick Ragsdale
Major: Biochemistry and Molecular Biology

A series of experiments have characterized the loss of dopaminergic neurons in the soil nematode Caenorhabditis elegans (C. elegans). These previous investigations utilized 6-hydroxydopamine (6-OHDA) to kill the dopaminergic neurons and then determined the mean velocity of the worms after a physical stimulus. To elaborate on the investigation, dopamine was given to the worms following 6-OHDA treatment. A potential flaw to this experimental design is the short time period that the investigation recorded following a physical stimulus. Thus, the current experiment investigates the effect of dopamine on the chemotaxis of C. elegans to a volatile attractant.

Chemistry

“Determining the Distribution of Boron in Coal Ash and Plants Grown in Contaminated Soil”
Loren Brown
Faculty Advisor: Alison Moore, Ph. D.
Major: Professional Chemistry

Fly ash is a coal waste by-product that contains areas of high boron concentrations. Consequently, boron is labeled as the most phytotoxic element of coal ash. Moreover, boron is known to reduce plant growth significantly at concentrations greater than 2 ppm. As a result, plants that absorb boron from the ground can enter the food chain through plant-consuming animals. When these animals absorb large amounts of boron, the male reproductive organs will be affected. Accordingly, female animals exposed to boron during pregnancy may have their offspring suffer from birth defects or delayed development. To analyze the boron concentrations, EPA methods 3051 A and 6010 C will be used. A standard plant and three different plants were grown in contaminated fly ash containing varying concentrations of boron.
“Characterizing Possible Antibacterial Compounds Found in Aloe Vera”
Brandon Ladage
Faculty Advisor: Alison Moore, Ph. D.
Major: Honors, Pharmaceutical Studies

Aloe vera (Aloe barbadensis Miller) is well documented as a healing agent. While commonly used to treat burns and cuts, it has also been shown to have mild antibacterial properties as well. Although several studies have examined the effectiveness and range of aloe vera as an antibiotic, they disagree as to which compounds are responsible for aloe's antibacterial activity. This study seeks to better characterize which compounds are responsible by focusing exclusively on identification of those compounds rather than on their effectiveness. This was done by isolating aloe compounds in different combinations and testing those isolations for antibacterial properties. Based on the methods used to isolate the compounds, this process has identified possible antibacterial compounds. Further studies will seek to identify the mechanism behind the compounds' antibacterial properties.

“Determining the Bioavailability of Chemical Stimulants in Energy Drinks after Digestion”
Vinh Mai
Faculty Advisor: Alison Moore, Ph. D.
Major: Chemistry for the Health Sciences

Energy drinks are used for improvement in mental performance and reduction in sleepiness because they contain high levels of caffeine, vitamins, and many other supplements. This project determines the bioavailability of chemical stimulants from most common ingredients in the energy drinks by using pepsin digestion under simulated gastric condition (37°C and pH1.2). The available products after pepsin digestion will be characterized using high performance liquid chromatography (HPLC), a chromatographic technique that can separate mixture of compounds to identify, quantify and purify the individual components of the mixture. The digestion products will be varied due to the digestion time of each ingredient.

“Characterizing Compounds in Honey that May Inhibit Bacterial Growth”
Nicole Smith
Faculty Advisor: Alison Moore, Ph. D.
Major: Chemistry for the Health Sciences

MRSA is a bacterial infection that is highly resistant to antibiotics. Thus an interest in finding different remedies to fight MRSA has developed. One remedy tested is honey. The antibacterial properties of honey (osmotic effect, acidity, and hydrogen peroxide production) allow it to be a plausible solution. Several bacterial cultures were grown in the presence of honey to determine whether inhibition of bacterial growth was observed. The effect of Manuka honey on MRSA growth has been studied by other groups and findings show that the presence of high non-peroxide activity doubles the antibacterial activity compared to other honeys. To continue this research, several bacterial cultures were grown in the presence of “active” and “non-active” Manuka honey and zones of growth inhibition were noted. The isolation of proteins or other compounds in the honeys will show the chemical component that is causing the differentia in bacterial growth.

Environmental Science
“Soil Quality in Public Spaces”
Melanie Judd
Faculty Advisor: Darlene Panvini, Ph.D.
Major: Environmental Science

The quality of soil directly impacts the health and vitality of the plants that grow there. Human activities can affect the quality of soil both positively and negatively. This project examines soil quality in nine different types of public spaces (small urban park, a large natural park, interior and exterior of a college campus, community garden, roadside, parking lot median, and golf course) and performs a soil analysis for each sample analyzing variables in three categories: chemical, physical, and biological. Soil samples were analyzed using LaMotte soil test kits, Vernier probes, and a variety of other tests. The aim of this project is to become more aware of how human actions impact soil quality.
“Comparison of Water Quality in Two Middle Tennessee Wetlands”
Sarah K. Updegraff  
Faculty Advisor: Darlene Panvini, Ph.D.  
Major: Environmental Science

The quality of a wetland can be affected by several variables, including type of wetland, location, presence of nearby human activity, and seasonal changes. Water quality can be assessed by biological factors (e.g., plankton biodiversity), as well as chemical/physical variables (e.g., dissolved oxygen, temperature). The age of the wetland and type of management can also affect the quality and structure of a wetland. In this study plankton diversity and water quality were compared among two different types of wetlands: one is naturally managed whereas the other is newer and more highly managed following a development project. Both wetlands are situated near busy highways. Water quality data (dissolved oxygen, pH, temperature, conductivity, and turbidity) were collected at both sites over a period of six weeks and a water quality index (Q) determined. Samples from each site were taken to the lab for plankton diversity analyses (using Simpson’s and Shannon-Weaver Indices of Biodiversity). Water samples were collected from open water areas and from areas with surrounding vegetation. Preliminary results suggest that water quality is positively correlated with plankton diversity and that both are higher in the less managed wetland. Samples collected from the vegetation areas have a greater diversity of plankton. Implications for wetland management and further wetland studies are presented.

Mathematics

“Research Proposals in Mathematics, Computer Science and Related Disciplines”
Faculty Advisor: Glenn Acree, Ph.D.
Majors: Mathematics and Computer Science

As an introduction to undergraduate research, students in MTH 2250 - Discrete Mathematics are required to present research proposals at the Science Undergraduate Research Symposium. Each student has completed explorations leading to two 3-5 page papers uncovering areas of mathematics and/or computer science that have piqued their interest. The students had the choice of interviewing a faculty member in the department, investigating the work of a mathematician or computer science, surveying a more general topic, or reviewing a journal article. Through literature reviews, the study of the text, class discussion and individual exploration, each student has formulated a research proposal outlining the primary question(s) of interest, the relevance of the proposal for the study of mathematics or computer science and a summary of necessary steps of action for carrying out the research. The proposal includes a brief survey of work previously completed by others in the area of interest and a list of sources that should be considered. The proposal may also include conjectures if appropriate, along with reasons for formulating such conjectures.

“Composing Two Non-Tricolorable Knots”
Kelly Harlan
Faculty Advisor: Rolland Trapp, Ph.D., CSU-San Bernardino
Major: Mathematics

A knot diagram is made up of several arcs meeting at knot crossings. A coloring of a knot diagram is an assignment of colors to each of the arcs in such a way that at every crossing, the three arcs that meet at that crossing have either all the same color or all different colors. A knot is tricolorable if you can color its diagram with exactly three colors. In the early 2000s, Colin Adams asked whether the knot sum of two non-tricolorable knots is non-tricolorable. We prove that the answer is yes. Although this question had earlier been resolved, our methods are new: We use mod $p$ coloring, coloring matrices, and their determinants in our solution.
Physics
“The Effectiveness of Sound Barriers for Residential Neighborhoods”
Chris Diebold, Chris Moffitt, Zach Shrout, Erik Thompson
Faculty Advisor: Scott H. Hawley, Ph.D.
Major: Audio Engineering Technology

Throughout the United States sound barriers have been erected along highways and city roads for the purpose of reducing traffic noise in residential neighborhood. Our group will study the effectiveness of one of these barriers. We will perform a sound analysis by using SPL meters and spectrum analysis software to take measurements on both sides of the sound barrier.

Psychology
“Effects of Orientation on Perception of Biological Motion”
Andy Cole, Megan Patterson, Leslie Simmons, and Evan Vaughn
Faculty Advisor: Lonnie Yandell, Ph.D.
Major: Honors

Previous studies suggest that perception of biological motion becomes more difficult when viewed from an atypical orientation. In this study, 13 subjects were exposed to two sets of point-light displays. One set of four figures, two human and two animals, simulated biological motion at 0 degrees, a standard viewing perspective. The same set of figures was shown rotated 180 degrees. Participants recorded at what point they detected biological motion from the stimuli. The expected outcome of this study was that it would take subjects longer to detect biological motion from inverted stimuli than from regularly oriented stimuli. We found no difference between identification of human versus animal figures. We found that our results corroborate and extend previous findings by demonstrating that biological motion is more difficult to perceive when an image is inverted.

“Semantic Satiation on Abstract and Concrete Words”
Sarah M. Currey, Chauncey A. Meade, and Emily C. Snyder
Faculty Advisor: Lonnie Yandell, Ph.D.
Major: Honors

Semantic Satiation is a phenomenon in which repetition of a word results in temporary loss of meaning for the listener. Previous research has shown that word recognition decreases as a word is repeated, which provides insight into word meaning and processing. The experiment will test whether the effect will occur quicker and more often when abstract words or concrete words are repeated. Abstract words are classified as those with intangible definitions; concrete words are classified as those with tangible meanings. In this study, fourteen Belmont students will listen to a series of word repetitions and be asked to record when they detect a change in the word’s meaning. The word repetitions will include three abstract words that do not change, three concrete words that do not change, and three arbitrary words that do in fact change. The expected outcome of this study is that the subjects will become satiated more quickly when listening to an abstract word repetition than when listening to a concrete word repetition.

“The Effects of Obstruction on Path Guided Motion”
Alec Hampton, Carolyn Buehler, Jordan Helms
Faculty Advisor: Lonnie Yandell, Ph.D.
Major: Honors

Previous research has suggested that the illusion of a path of motion can be created by the intermediate flashing of two stimuli. Research has further suggested that the installation of an arc shape above the flashing stimuli, one that also flashes in turn will create the illusory impression of a path following the shape of the arc. This current study sought to investigate the effect of obstruction on subjects’ perceptions of the paths of motion. Thirteen Belmont University students were asked to observe three different slides in varying orders, and to identify the path of motion they perceived, as well as the strength of the path on a scale of one to five, one being not clearly at all, and five being very clearly. The first slide had no obstruction and featured simply the flashing stimuli with an arc in between. The second slide had a block shape obstructing the straight path, while the third slide had a block obstructing the arced path. We expect to find that the slide that had a block shape obstructing the straight path will cause an increase in the clarity of the perceived arced path.
“The Effects of Color on Motion After Effects”
James O. Kent, Laura D. Haupt, Nathan D. Phelps, Holly N. McKee
Faculty Advisor: Lonnie R. Yandell, Ph.D.
Major: Honors

A motion after effect (MAE) is a phenomenon where retinal fatigue induces the illusion of motion. When a subject experiences a moving stimulus for an extended period of time, and then the stimulus is removed, the subject continues to perceive motion where there is none. This study aims to explore the effects of color on the duration of the MAE. Thirteen Belmont University students were split into four groups, and asked to stare at a PowerPoint presentation which displayed a rotating stimulus for thirty seconds, after which the stimulus was replaced by a blank slide, either red, green, blue or white in color. Each color was assigned to a station, and each participant and group experienced all possible variations, with time for ocular recuperation scheduled between cycles. The subjects were then asked to indicate when the MAEs had disappeared, and a stopwatch recorded the duration. It was hypothesized that lighter colors would produce a longer effect.

“ORAL PRESENTATIONS
McWhorter Room 110
6:15 – 9:00
Dr. Pete Giordano, Moderator

6:15 – 6:30
“The Effects of Color on Motion After Effects”
James O. Kent, Laura D. Haupt, Nathan D. Phelps, Holly N. McKee
Faculty Advisor: Lonnie R. Yandell, Ph.D.
Major: Honors

A motion after effect (MAE) is a phenomenon where retinal fatigue induces the illusion of motion. When a subject experiences a moving stimulus for an extended period of time, and then the stimulus is removed, the subject continues to perceive motion where there is none. This study aims to explore the effects of color on the duration of the MAE. Thirteen Belmont University students were split into four groups, and asked to stare at a PowerPoint presentation which displayed a rotating stimulus for thirty seconds, after which the stimulus was replaced by a blank slide, either red, green, blue or white in color. Each color was assigned to a station, and each participant and group experienced all possible variations, with time for ocular recuperation scheduled between cycles. The subjects were then asked to indicate when the MAEs had disappeared, and a stopwatch recorded the duration. It was hypothesized that lighter colors would produce a longer effect.

“This Effect of Gender on Figure-Ground Reversal”
Matthew Maher, Jessica Pearsall, and William Ryan
Faculty Advisor: Lonnie Yandell, Ph.D.
Major: Honors

Figure-ground reversal is a term used to describe an image in which there are two different portions that can be seen ambiguously. They are made of two contrasting colors, usually black and white, so that when people view these images, they will only see one of the images at a time. The ability to perceive colors is partially due to a chemical coded for by part of the X chromosome. Since women have more X chromosomes than men, women are more adept than men at perceiving vibrant colors (Verrelli and Tishkoff, 2004). When figure-ground images were altered to contain vibrant colors rather than black, women should be more likely to see those particular figures of the images than men. In this study, fourteen Belmont students were shown a PowerPoint presentation consisting of two sets of five figure-ground images, one set containing black-and-white images and one set containing vibrant color-and-white images. The students were asked to identify which figure of the image they recognized first and their response times were recorded. It was expected that the women would recognize the colored images quicker than the white images and quicker than men.

“Scheduling Prison Guards and Faculty: Examples Using Linear Programming”
Stephanie Bobo
Faculty Advisor: Dr. Andrew Miller
Discipline: Mathematics
Major: Mathematics

This talk will present the solutions of scheduling problems using linear programming to find an optimal solution. In particular, we look at a scheduling problem dealing with prison guards in which the objective is to minimize the number of overtime hours; this problem is based on a UMAP module published by COMAP. We re-implemented a solution of this problem in MATLAB. In addition, we look at an unsolved scheduling problem: assigning faculty to classes so that the workload is fairly distributed. We solve this problem with real data from Belmont’s math and computer science department as an example and compare to past schedules.
6:30 – 6:45
“Guiding Math Teachers to Success”
Jordan D. Bragg
Faculty Advisor: Dr. Andrew Miller
Discipline: Mathematics
Major: Mathematics/Education

This presentation will cover the key principles that guide math teachers to success. One of the first key topics that will be highlighted is the importance of researching student’s learning styles. There are three different learning styles discussed in this presentation. These learning styles include visual, auditory and kinesthetic. Another key principle guiding teachers to success is the effectiveness of both conceptual understanding and cooperative learning. It is crucial that the teacher understands how to effectively present a concept to diverse learners. A Calculus II lesson covering anti-derivatives will be included to effectively demonstrate how to present this lesson to visual learners, auditory learners, and kinesthetic learners. The different strategies with respect to how to deliver the material to diverse learners will be discussed after the lesson is presented.

6:45 – 7:00
“The Effect of Gesture on Delayed Recall for Concrete and Abstract Words”
Faculty Advisor: Lonnie Yandell, Ph.D.
Discipline: Psychology
Major: Psychology

Past research has observed a connection between social mannerisms, such as gesturing while speaking, and language comprehension or production. This study examined the relationship between the presence or absence of gestures and word recall. It was hypothesized that words with accompanying gestures would be more easily recalled in a delayed recall test than words with no accompanying gestures. Furthermore, it was hypothesized that concrete word-gesture pairs will be more easily recalled than abstract word-gesture pairs. Approximately 20 students from Belmont University participated in this study. Participants each viewed a video of twenty 2-second clips of spoken words, 10 words with accompanying gestures and 10 words without gestures. After watching the video twice and completing intervening tasks for 20 minutes, participants recalled as many words as possible. The numbers of words correctly remembered by participants will be analyzed in a 2x2 repeated measures ANOVA. These results will hopefully reveal the effect of gestures for concrete and abstract word recall.

7:00 – 7:15
"Does Even Shorter Short-Term Action Video Game Play Affect Executive Attention?"
William B. Hobbs & Ken Parrish
Faculty Advisor: Lonnie Yandell, Ph.D.
Discipline: Psychology
Major: Psychology

As video games become more interactive and more compelling, the lines between reality and virtual reality slowly fade. Currently, children and adults alike spend more time engaged in video game play than ever before. Naturally, many studies have been concerned with the effects of such play on cognition and other functions. This study seeks to replicate results found in past research (Parrish and Hobbs, 2010) that participants who played an action video game play for only thirty minutes achieved faster reaction times on a computerized Stroop task (Stroop, 1935) than participants who played a non-action video game for thirty minutes. Approximately 45 undergraduate students from Belmont University were assigned to play either an action (Starwars: The Force Unleashed) or non-action (The Sims 2: Pets) video game for either 10 or 30 minutes. After playing the game, participants completed a computer based Stroop task and a survey on their immersion in the video game environments. We expect that face-paced, action-based, video game play provides players with a “virtual training ground” in which it is possible to sharpen cognitive functions, specifically executive attention skills. The purpose of this study is to not only replicate the aforementioned findings, but also to determine whether only ten minutes of either action or non-action video game play results in similar benefits.
7:15 – 7:30
“The Effects of Appearance-based Rejection Sensitivity and Media-Ideal Internalization on Desire for Social Interaction”
Jennie Mashburn
Faculty Advisor: Lonnie Yandell, Ph.D
Discipline: Psychology
Major: Psychology/Spanish

Negative body image affects both men and women in today’s society. Body-image related problems such as eating disorders, body dysmorphic disorder, cosmetic surgery, and dieting run rampant in our culture. Media images promote physical “perfection:” for men, to be ultra muscular and for women, to be ultra thin. The internalization of media ideals increases negative body image. Also, appearance-based rejection sensitivity (ARS), the tendency to expect rejection based on appearance, is also related to negative body image and the poor coping mechanism of avoiding social interaction. This study consists of paired male and female participants viewing media ideals and receiving slightly negative appearance feedback under the assumption that they are rating advertisements. The hypothesis is that high ARS and high media-ideal internalization will result in the least desire for social interaction after viewing media ideal images and receiving negative appearance feedback. A 2x2 ANOVA will be used to analyze the effects of Media Ideal Internalization and Appearance-based Rejection Sensitivity on desire for social interaction.

7:30 – 7:45
“Personality Characteristics of Introversion and Extraversion in Change Blindness: Real-World Interactions”
Megan N. Drucker, Brianna D. Howard and Marie M. Prepit
Faculty Advisor: Dr. Lonnie Yandell, Ph.D.
Discipline: Psychology
Major: Psychology

There are changes that occur in the environment that may go unnoticed, as we cannot attend to everything in our visual field. A phenomenon known as change blindness, or the difficulty in detecting changes between different stimuli from one viewpoint to the next, explores these changes. Past research has yet to discover why change blindness occurs in some people and not others. Recent studies suggest that personality differences may predispose one to experience change blindness. This study examined the influence of the personality characteristics of extraversion and introversion on the occurrence of change blindness. Approximately 50 participants from Belmont University completed part of the "Big Five Domains" survey (Goldberg, 1999) to measure introversion and extroversion. Participants detecting change in researcher’s, as two researchers switched during the experiment, were used to measure the occurrence of change blindness. It was hypothesized that those who were more extraverted were more likely to notice a change, therefore less likely to experience change blindness.

7:45 – 8:00
“Choice Blindness Using Auditory Stimuli”
Angie Melgar, Sally West, and Jennie Mashburn
Faculty Advisor: Lonnie Yandell, Ph.D.
Discipline: Psychology
Major: Psychology

Choice blindness is a little known condition in which a change in the outcome of a choice goes unnoticed by the one who makes the choice. Although people assume they consciously make their own choices and remember them, previous studies have demonstrated that people do not necessarily consciously recall the decisions they make and may even come up with reasons for decisions that they do not make. Previous studies that have been conducted on choice blindness have used olfactory, gustatory, and visual stimuli. Since choice blindness and hearing has not been studied, the present study examined choice blindness using auditory stimuli. Approximately thirty male and female participants will choose between fifteen pairs of song clips (half very different and half very similar) and give an explanation for each choice. On four of the trials false feedback will be given, with the non-chosen clip being played back to the participants as if they were chosen. The false feedback trials are expected not to be detected more than would be expected by chance. On false feedback trials, different sound pairs are more likely to be detected than similar sound pairs. If evidence for choice blindness for auditory stimuli is found, we will discuss how this relates to previous studies of choice blindness using non-auditory stimuli.
Distance perception involves estimating how far away a figure or image appears to an observer. This concept has been explored as it relates to the perceiver’s desirability; that is, perceivers see desirable objects as closer because of the satisfying behavior the perception evokes. This study examined how replacing a desirable stimuli with fear-producing stimuli affected distance perception. It was hypothesized that images evoking fear would be perceived closer than they actually were as a survival mechanism. In this study, six fear response pictures and six neutral response pictures from the International Affective Picture System were used. Participants sat at the end of a table and estimated the distance between the edges of the table to the image shown on a computer screen. The computer screen was moved to three different distances in alternating sequences. It is expected that fearful images would be estimated to be closer than neutral images. This research could help provide further knowledge about how our biological perceptions have adapted for survival purposes.

Short-term action video game play has been found to reduce the Stroop effect implicating improvement in executive control ability (Parrish and Hobbs, 2010). In this study we examine the effects of immersion and task difficulty on executive control ability. We expect that playing an action video game for a short time on a hard difficulty level will result in better performance on an executive attention task than playing on an easy difficulty level. Also playing an action video game for a short term will result in higher levels of immersion and better performance on an executive control task than playing a non-video game for a short term. This study examined the accuracy and reaction time on the Stroop Task (Stroop, 1935) as a measure of executive control. Thirty participants played either an action video game in an easy or hard difficulty mode or a non-video game solving easy puzzles or hard puzzles. After playing for 30 minutes in one of these four conditions, the participants completed a computerized version of the Stroop Task and an immersion questionnaire. 2x2 ANOVAs will be conducted on reaction times for congruent, incongruent and control trials from the Stroop test for type of game and task difficulty. An 2x2 ANOVA will be conducted on the level of immersion for type of game and task difficulty.

Research has shown that environmental stimuli, such as odor and sound can unconsciously influence many behaviors (Liljenquist, Zhong, & Glainsky, 2008). Liljenquist et al., (2010) found that citrus scent can influence virtuous behavior such as reciprocity and charity. In this study approximately 50 undergraduate students from Belmont University were asked to complete a math worksheet, an English worksheet, and then a form asking for volunteers for Habitat for Humanity. Students completed these forms in either a room with pleasant smell (scented with a citrus-based cleaning spray) and pleasant music (Piano Meditation), a room with pleasant smell and unpleasant, atonal music (August Symphony), a room with unpleasant smell (scented with Stinky Sweat Spray) and unpleasant music, or a room with unpleasant music and unpleasant smell. After completing the forms, time and amount of money that participants reported to be willing to donate to charity were analyzed to determine the influences of scent and music on charitable behavior. We expect to replicate the effects of pleasant smell and music on positive behavior, and find that unpleasant smell and sound will inhibit charitable behavior.
The relationship between situational context, emotional perception, and decision-making in the consumer market will be explored. After reviewing an article depicting the current state of the economy and current starting salaries as either negative or positive, fifty Belmont University undergraduate students will see a series of pairs of common retail items (e.g., purse, car) and rank their probability of purchasing one item over the other. For each pair of items, one will be a luxury item and the other a less expensive option. Afterwards participants will complete a twenty-eight item semantic differential scale (Ajzen, 1988; Bradley & Lang, 1994) measuring their emotional attitudes toward the current state of the economy and their perceived accuracy of the article reviewed. It is predicted that participants who experience a positive economic context will react more positively towards luxury items and will select fewer non-luxury items. In contrast, participants experiencing a negative economic context will select fewer luxury items and more non-luxury items.

McWhorter Room 114
6:15 – 8:45
Dr. Linda Jones, Moderator

6:15 – 6:30
“Digestion and Bioavailability of Lycopene in Tomato Products”
John Wright
Faculty Advisor: Alison Moore, Ph.D.
Discipline: Chemistry
Major: Professional Chemistry

In this study an in vitro model was developed to simulate digestion and to measure the amount of lycopene and other antioxidants released from tomato products during typical digestive conditions. Lycopene is an acyclic isomer of β-carotene and as a polynene it undergoes cis-trans isomerization induced by light, thermal energy, and chemical reactions. However, the high lycopene levels in tomatoes do not correlate with overall bioavailability of lycopene within the body. Dietary intake of tomatoes and tomato products containing lycopene has been shown to be associated with a decreased risk of chronic diseases, such as cancer and cardiovascular disease. Lycopene's configuration enables it to inactivate free radicals, especially those derived from oxygen. To determine relative concentrations of lycopene, tomato samples, tomato paste, and tomato juice were obtained. After digestion, samples were analyzed using high-performance liquid chromatography.

6:30 – 6:45
"Counterexamples in Calculus"
M Sean Morey
Faculty Advisor: Daniel Biles
Discipline: Math
Major: Mathematics and Audio Engineering Technology

Textbooks in mathematics often teach us to blindly accept and apply the boxed and bolded theorems they contain. This method of learning tends to constrain the healthy skepticism and curiosity that all great mathematicians need to break free from the present limitations of mathematics. In this presentation, we will examine calculus-based conjectures that appear to be true; however, with some creative thinking, we will show that they are inadequate. This exploration of calculus without the crutches of unquestioning belief gives us the opportunity to learn (or re-learn) calculus through understanding and discovery instead of through memorization.
6:45 – 7:00
“Learned Helpless and Order of Question Difficulty in Test-Taking Performance”
Julie Malkowski, Jennie Mashburn, & Jessica Stephens
Faculty Advisor: William Bailey, Ph.D.
Discipline: Psychology
Major: Psychology

Learned Helplessness is a psychological state in which an individual feels powerless or that they do not have control over a situation and as a result will give up or stop working to complete a task. Students are faced with a variety of challenges that can lead to feelings of helplessness and a loss of control such as test-taking. A previous study carried out by Firmin, Hwang, Copella, and Clark (2004) showed that when a test began with difficult questions, learned helplessness caused students to do more poorly than the students presented with a test beginning with easy questions. In the present study we investigated the effects of learned helplessness and order of question difficulty on test-taking ability. Participants were randomly assigned to take a test with either easy questions presented first or difficult questions first. These questions were taken from the Princeton GRE practice tests that had been previously ranked according to difficulty. We hypothesize that because of learned helplessness, participants that have difficult questions presented first will do more poorly on the test than those presented with easy questions first. Scores will be analyzed with a t-test for independent groups.

7:00 – 7:15
“Conforming to Social Pressure by Breaking the Rules”
Jabe Holloway, Sally West, Kelly Dennison, and Katie Cross
Faculty Advisor: Seraphine Shen-Miller, Ph.D.
Discipline: Psychology
Major: Psychology

Social pressure and subsequent conformity has been observed before in such classic studies as Solomon Asch’s line test. This study uses a similar setup to observe whether social pressure in a group setting can influence people into conforming through breaking a rule. The participants were administered individual surveys in groups of four. In every group setting, two of the participants were actually confederates. Before the survey was given out, the participants were instructed that the rules are “No Texting, No Talking, and Remain Seated”. In the experimental group, the confederates sent text messages throughout the survey process. In the control group they did not. We expected that the actual participants would conform to the texting behavior displayed by the confederates.

7:15 – 7:30
"How Social Observation Influences Anxiety"
Dawn Jiacolletti, Jessica Ligon, Orlando Pisegna and Ashley Wilson
Faculty Advisor: Seraphine Shen-Miller, Ph.D.
Discipline: Psychology
Major: Psychology

Anxiety is a part of everyday life and has numerous causes. One of these causes is the feeling that someone is "looking over your shoulder." Stress and anxiety are also factors in personal performance and overall physical health. This study looked at the effects of social observation and its implications on anxiety levels. In the control group we recorded the anxiety levels of participants engaged in a cognitive task without the presence of a direct observer. In the experimental group we recorded the anxiety levels of participants engaged in the same cognitive task with the presence of a direct observer. We hypothesized that the presence of an observer while completing a cognitive task would result in a significant in heart rate as detected by the Biopac machine.
Social interaction is a key component to communication and cooperation among people. As a social species, social interaction is particularly important for humans. Some situations that require socializing can cause different degrees of anxiety and/or discomfort. When the social situation involves others evaluating oneself, there can be much fear or concern of how other people will perceive one's self. This research study aimed to examine whether having one's identity be anonymous in these socially evaluative situations will create a difference in the level of social anxiety the individual experiences. A socially evaluative situation was created for this experiment. Blindfolds were used to create a sense of anonymity for participants in the experimental condition. It was hypothesized that those subjects with blindfolds would experience less social anxiety than the subjects without blindfolds.

Cell Phones have quickly made a transition from luxury items to necessities that individuals cannot function without in recent years. Mobile phones offer an immediate and fairly reliable way to interact with others no matter where a person is located. However, some individuals experience a significantly higher amount of anxiety and distress when separated from their cell phone. This study examines the correlation between attachment styles, personality, and cell-phone dependency in an attempt to identify the source of this pronounced anxiety some people feel when separated from their cellular phone. 60 Undergraduate Students from Belmont University were asked to complete a blended assessment comprised of the short version of the Text-messaging Dependency Scale (Igarashi, 2010) and the Revised Adult Attachment Scale (Collins, 1996) followed by the Mini-Marker Big 5 Personality assessment (Saucer, 1992). We hypothesized that high perceived levels of text messaging dependency will be positively correlated with insecure attachment styles. High perceived levels of text messaging dependency will be positively correlated with the neurotic personality type and that individuals with a neurotic personality trait will be positively correlated with an insecure attachment style.

Past research observed the correlation between social facilitation and personality characteristics. This study examined the correlation between social facilitation and personality characteristics of extraversion and self-esteem. It was hypothesized that social facilitation would be positively correlated with self-esteem and extraversion. The students that participated in this study were from Belmont University. A survey measuring extraversion, self-esteem, and social facilitation was administered to all participants. A Pearson correlation displayed a significant correlation between extraversion and social facilitation and self-esteem and social facilitation. These results support past theories relating personality characteristics and social facilitation.
8:15 – 8:30
“Effects of Repeated Testing Versus Repeated Studying on Information Recall”
Sherri Joyce, Lindsey Thompson, & Chloe Williams
Faculty Advisor: William Bailey, Ph.D.
Discipline: Psychology
Major: Psychology

Studying is often promoted for learning new information, but research shows that studying alone may not be as effective as other learning techniques or tasks. Roediger and colleagues (2008) have shown that repeated testing (or pre-testing) instead of repeated studying might be as effective, if not more effective, than studying for recalling new information. This study compares the results of pre-testing individuals versus individual continued studying on a test over a one-page description of a fictitious animal. Two randomly assigned groups of participants each read the page on the animal and took a final 20-question test over the information. One group received extra studying time with the page. The other group took a 10-question pre-test and was given correct answers to the pre-test before the final test was taken. The final test also contained two self-evaluation questions asking how the participant felt he or she did, and how effective the preparation type (either pre-testing or studying) was in remembering the material. The average scores of both groups were compared using a two-tailed t test.

8:30 – 8:45
“Socioeconomic Status and Risk Taking”
Brenda Jones & Chasity Ashmore
Faculty Advisor: William Bailey, Ph.D.
Discipline: Psychology
Major: Psychology

The relationship between an individual’s socioeconomic status and risk taking behavior will be explored. Fifty-Seventy Belmont University undergraduate students enrolled in Introduction to Psychological Science will give a response to four brief scenarios that will measure their risk taking behavior (Kahneman & Tversky, 1979). Afterwards participants will complete the Socioeconomic Mentality Test (Payne, 2001), a 62 multiple choice item questionnaire that will measure their socioeconomic status. It is hypothesized that participants with higher Socioeconomic Status will take more risks than students with lower socioeconomic statuses. It is predicted that the reason behind this hypothesis is that they will be more motivated to take a risk to increase their money versus a student who is risk averse and does not want to risk a loss.